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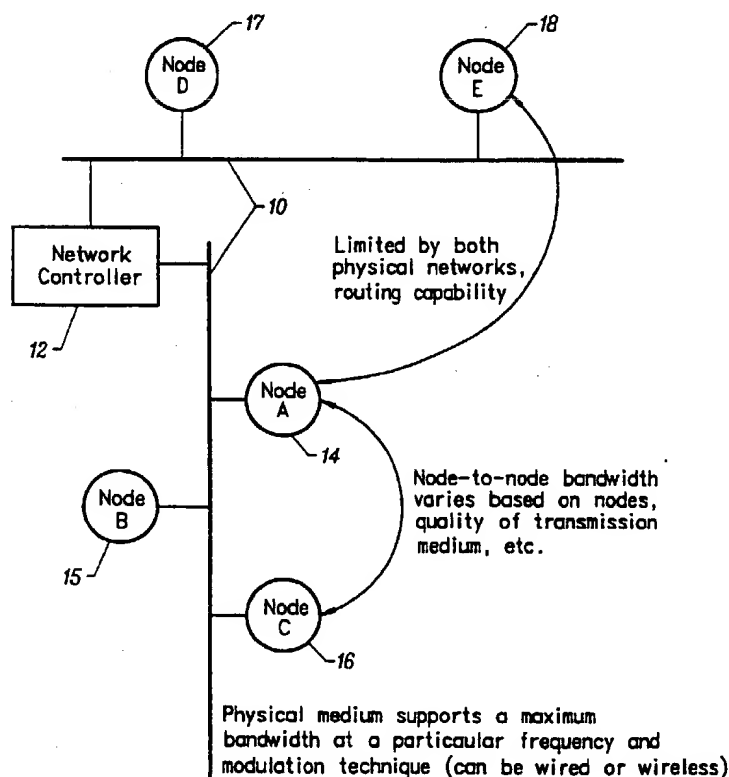
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- (74) Agents: GLENN, Michael, A. et al.; Glenn Patent Group, 3475 Edison Way, Suite L, Menlo Park, CA 94025 (US).
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- (71) Applicant: TIVO, INC. [US/US]; Suite 100, 894 Ross Drive, Sunnyvale, CA 94089 (US).
- (72) Inventor: BARTON, James, M.; 101 Sund Avenue, Los Gatos, CA 95030 (US).
- Published:
— With international search report.

[Continued on next page]

(54) Title: METHOD AND APPARATUS IMPLEMENTING A MULTIMEDIA DIGITAL NETWORK



(57) Abstract: A method and apparatus for efficiently managing the allocation of available data capacity on a physically shared digital network among devices connected to that network is disclosed. Also disclosed is a method and apparatus for managing the ongoing timely movement of data on the shared network such that precise long-term data rates are achieved between attached devices with minimal additional buffering. The invention further comprises a method and apparatus which allows the use of any remaining network capacity for non time-critical data movement without the need for centralized access management.

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 99/16113

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 H04L12/64 H04L12/403 H04L12/407

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 0 596 651 A (NAT SEMICONDUCTOR CORP) 11 May 1994 (1994-05-11) abstract figures 2,4 claims 1,2,16,18 page 3, line 27 -page 5, line 23 -/-	1 7-10, 16-24, 27, 33-36, 42,43, 46-50

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

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- *Y* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *A* document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/16113

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	WO 97 39556 A (PEAK AUDIO INC) 23 October 1997 (1997-10-23) abstract figures 1-3,7,8 claims 1,4,7,12 page 3, line 5 -page 4, line 7	1 7-10,16, 17, 20-25, 27, 33-35, 42-51
X A	MOORWOOD A: "IMPLEMENTING A MULTIMEDIA CAPABLE NETWORK USING ATM AND IEEE 802.9A(ISOCHRONOUS ETHERNET) TRANSPORT TECHNOLOGIES" WESCON CONFERENCE,US,IEEE CENTER, HOES LANE,27 September 1994 (1994-09-27), pages 16-21, XP000532558 ISSN: 1044-6036 the whole document	1 7,9-17, 20,27, 33,35, 42,46
X A	WORSLEY D J ET AL: "ISOCHRONOUS ETHERNET-AN ATM BRIDGE FOR MULTIMEDIA NETWORKING" IEEE MULTIMEDIA,US,IEEE COMPUTER SOCIETY, vol. 4, no. 1, 1 January 1997 (1997-01-01), XP000685699 ISSN: 1070-986X the whole document	1 7,8,16, 17, 20-25, 27,33, 35,42,46
X A	US 5 771 350 A (KIM DONG WON) 23 June 1998 (1998-06-23) abstract claims 1,3,7 figures 1,2 column 2, line 34 -column 4, line 8	1 7,16,20, 27,33, 42,46

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/16113

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>MARSAN M A ET AL: "Fairness and efficiency of slot reuse algorithms in DQDB MANS"</p> <p>COMPUTER COMMUNICATIONS,NL,ELSEVIER SCIENCE PUBLISHERS BV, AMSTERDAM, vol. 20, no. 15, 15 December 1997 (1997-12-15), pages 1323-1341, XP004107398</p> <p>ISSN: 0140-3664</p> <p>abstract</p> <p>figures 1-5</p> <p>paragraphs '2.3.3!-'2.4.3!</p> <p>paragraph '04.1!</p>	2-6,26, 28-32,52
A	<p>RADHAKRISHNAN S ET AL: "A flexible traffic shaper for high speed networks: design and comparative study with leaky bucket"</p> <p>COMPUTER NETWORKS AND ISDN SYSTEMS,NL,NORTH HOLLAND PUBLISHING. AMSTERDAM, vol. 28, no. 4, 1 February 1996 (1996-02-01), pages 453-469, XP004002978</p> <p>ISSN: 0169-7552</p> <p>abstract</p> <p>page 459, column 1, line 9 -page 461, column 2, line 8</p>	2-6,26, 28-32,52
A	<p>REN W ET AL: "Multipoint-to-multipoint ABR service in ATM"</p> <p>COMPUTER NETWORKS AND ISDN SYSTEMS,NL,NORTH HOLLAND PUBLISHING. AMSTERDAM, vol. 30, no. 19, 14 October 1998 (1998-10-14), pages 1793-1810, XP004147426</p> <p>ISSN: 0169-7552</p> <p>abstract</p> <p>paragraph '04.2!</p> <p>figure 6</p> <p>paragraph '06.1!</p>	2,3,6, 26,28, 29,32,52
A	<p>US 4 587 650 A (BELL JOHN L)</p> <p>6 May 1986 (1986-05-06)</p> <p>cited in the application</p> <p>the whole document</p>	2,26,28, 52

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/16113

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1,7-25,27,33-51

Method and apparatus for allocating data capacity on a shared network providing an on-demand packet based service and an streaming media service (isochronous) by

computing a transmission schedule indicating when each connected device is permitted to transmit and

indicating unscheduled portions of network bandwidth.

2. Claims: 2-6,26,28-32,52

Method and apparatus for allocating data capacity on a shared network providing a network interface component with:

a counter and a register

where access to the network is regulated by comparing the values of counter and register.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/16113

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0596651 A	11-05-1994	JP 6284130 A US 5594734 A US 5566169 A US 5550802 A US 5521928 A US 5668811 A	07-10-1994 14-01-1997 15-10-1996 27-08-1996 28-05-1996 16-09-1997
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